

A METHOD AND SYSTEM FOR A HIGH-DENSITY PLASMA DEPOSITION
PROCESS FOR FABRICATING A TOP CLAD FOR PLANAR LIGHTWAVE
CIRCUIT DEVICES

5 ABSTRACT OF THE DISCLOSURE

A method for performing high aspect ratio gap fill during planar lightwave circuit top clad deposition. A plurality of waveguide cores are formed on a substrate, the waveguide cores having a plurality of gaps there between.

10 A cladding layer is formed over the waveguide cores and the substrate using a high-density plasma deposition process. The refractive index of the waveguide cores are controlled by using a dopant to be higher than the refractive of the cladding layer. An anneal process is performed on the cladding layer after the high-density plasma deposition process. The gaps between the waveguide cores can be smaller than 2 microns. The aspect ratio of the gaps between the

15 waveguide cores can be greater than 3. The high-density plasma deposition process provides a very high purity USG (undoped silica glass) and BPSG (Boron Phosphorous silica glass) layers having a uniform refractive index. An overlying layer of doped silica glass can be deposited over the HDP deposited layer using PECVD (plasma enhanced chemical vapor deposition) techniques.

20 The doped silica glass can comprise BPSG or GeBPSG (Germanium Boron Phosphorous silica glass).